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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

CHU, CHRIS C

ART UNIT PAPER NUMBER

2815

DATE MAILED: 12/17/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/929,350

Applicant(s)

ELDRIDGE ET AL.

Examiner

Chris C. Chu

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 06 September 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1 - 183 is/are pending in the application.
- 4a) Of the above claim(s) See Continuation Sheet is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 37 - 44, 60, 62 - 72, 88 - 117, 119 - 128, 130 and 131 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 August 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

Continuation of Disposition of Claims: Claims withdrawn from consideration are 1 - 36, 45 - 59, 61, 73 - 87, 118, 129 and 132 - 183.

## **DETAILED ACTION**

### ***Election/Restrictions***

1. Applicant's election of III in Paper No. 5 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

2. Quick review of the claims of instant invention shows that claims 45 ~ 59, 61, 73 ~ 87, 118 and 129 do not belong in Species III. Therefore, Examiner hereby examines claims 37 ~ 44, 60, 62 ~ 72, 88 ~ 117, 119 ~ 128, 130 and 131.

In claims 45 ~ 59 and 73 ~ 87, the limitations "... integrated circuit-bearing chip ..." or "... non-integrated circuit-bearing chip ..." belong in other embodiments of instant invention.

In claim 61, the limitation "heat sink" belongs in Species XIII of instant invention.

In claims 118 and 129, the limitation "... said layer constituting an entire surface of the chip." Belongs in Species I of instant invention.

### ***Information Disclosure Statement***

3. The listing of references in the specification is not a proper information disclosure statement. 37 CFR 1.98(b) requires a list of all patents, publications, or other information submitted for consideration by the Office, and MPEP § 609 A(1) states, "the list may not be

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incorporated into the specification but must be submitted in a separate paper." Therefore, unless the references have been cited by the examiner on form PTO-892, they have not been considered.

### *Drawings*

4. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference sign(s) not mentioned in the description:

In Fig. 7A, the reference numeral "220" is not disclosed in specification of instant invention.

In Fig. 7C, the reference numeral "230" is not disclosed in specification of instant invention.

In Fig. 7E, the reference numeral "240" is not disclosed in specification of instant invention.

In Fig. 8A, the reference numeral "350" is not disclosed in specification of instant invention.

In Fig. 10A, the reference numerals "1020" and "1040" are not disclosed in specification of instant invention.

In Fig. 10B, the reference numeral "1110" is not disclosed in specification of instant invention.

In Figs. 12, 13D and 19, the reference numeral "635" is not disclosed in specification of instant invention.

In Fig. 13A, the reference numeral “620” is not disclosed in specification of instant invention.

In Fig. 13C, the reference numeral “630” is not disclosed in specification of instant invention.

In Fig. 14A, the reference numeral “1200” is not disclosed in specification of instant invention.

In Fig. 15, the reference numeral “660” is not disclosed in specification of instant invention.

In Fig. 16F, the reference numeral “700” is not disclosed in specification of instant invention.

In Fig. 17A, the reference numeral “1400” is not disclosed in specification of instant invention.

A proposed drawing correction, corrected drawings, or amendment to the specification to add the reference sign(s) in the description, are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

5. Applicant is required to submit a proposed drawing correction in reply to this Office action. However, formal correction of the noted defect may be deferred until after the examiner has considered the proposed drawing correction. Failure to timely submit the proposed drawing correction will result in the abandonment of the application.

***Specification***

6. The disclosure is objected to because of the following informalities:
- On page 20, line 5 from bottom, removes “300” after “embodiment.”
- On page 20, line 4 from bottom, “chip 200” should be --chip 300--.
- On page 21, line 4, removes “800” after “embodiment.”
- On page 21, line 5, “chip 200” should be --chip 800--.
- On page 21, line 11, removes “400” after “embodiment.”
- On page 21, line 11, “chip” should be --chip 400--.
- On page 21, line 6 from bottom, removes “400” after “embodiment.”
- On page 21, line 6 from bottom, “chip” should be --chip 400--.
- On page 22, line 3, removes “500” after “embodiment.”
- On page 22, line 3, “chip” should be --chip 500--.
- On page 24, line 4, removes “900” after “embodiment.”
- On page 24, line 10, removes “1600” after “embodiment.”
- Appropriate correction is required.

***Claim Rejections - 35 USC § 101***

7. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

8. Claims 37 ~ 131 are rejected under 35 U.S.C. 101 because the disclosed invention is inoperative and therefore lacks utility. Bridenbaugh et al., cited herein for evidence purpose, clearly discloses in column 1, line 14 ~ column 2, line 49 the hydrogen in a hermetically sealed semiconductor package accelerates failure and substantially increase the probability of infant mortality, i.e., the occurrence of early failures after deployment by an end user.

*Claim Rejections - 35 USC § 102*

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

10. Claims 37 ~ 44, 60, 62 ~ 65, 68 ~ 71, 88 ~ 102, 105 ~ 117, 119 ~ 124, 127, 128, 130 and 131 are rejected under 35 U.S.C. 102(b) as being anticipated by Bloom.

Regarding claim 37, Bloom discloses in Fig. 4, Fig. 5, column 1, lines 7 ~ 21 and column 8, lines 21 ~ 40 a semiconductor package comprising:

- a hermetically sealed enclosure (80 and 70) surrounding said package;
- a semiconductor chip (any component on area 60) within said enclosure;
- a first gas within said enclosure; and
- a source of releasable hydrogen (30) within said enclosure.

Regarding claims 38, 63, 89, 100, 113 and 122, since Bloom discloses in Fig. 4 air in space (65), said first gas comprises helium.



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Regarding claims 39, 64, 90, 101, 114 and 123, since Bloom discloses in Fig. 4 air in space (65), said first gas comprises hydrogen.

Regarding claims 40, 65, 91, 102, 115 and 124, since Bloom discloses in Fig. 4 air in space (65), said first gas comprises a mixture of helium and hydrogen.

Regarding claims 41, 68, 92, 105, 116 and 127, Bloom discloses in Fig. 4 and column 8, lines 21 ~ 40 said source of releasable hydrogen being a metal hydride.

Regarding claims 42, 69, 93, 106, 117 and 128, Bloom discloses in Fig. 4 and column 8, lines 21 ~ 40 said metal hydride being titanium hydride.

Regarding claims 43 and 70, Bloom discloses in Fig. 4 said package further comprising at least one heat source (25) for heating the source of releasable hydrogen so as to effect the release of hydrogen.

Regarding claims 44 and 71, Bloom discloses in Fig. 4 said package further comprising a plurality of heat sources (25) for heating the source of releasable hydrogen so as to effect the release of hydrogen.

Regarding claim 60, Bloom discloses in Fig. 4 further comprising a substrate (20), wherein said chip is attached to the substrate. Further, as to the language on line 2 of claim 60, the phrase “with a controlled collapse chip connection” is product-by-process claim language. Even though product-by-process claim is limited by and defined by the process, determination of patentability is based upon the product itself. The patentability of a product does not depend on its method of production. If the product in product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product is made by a different process. In re Thorpe, 227 USPQ 964, 966 (Fed. Cir. 1985) (citations omitted). A

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“product by process” claim is directed to the product per se, no matter how actually made, In re Hirao, **190 USPQ 15 at 17** (footnote 3). See also In re Brown, **173 USPQ 685**; In re Luck, **177 USPQ 523**; In re Fessmann, **180 USPQ 324**; In re Avery, **186 USPQ 116**; In re Wertheim, **191 USPQ 90** (**209 USPQ 254** does not deal with this issue); and In re Marosi et al., **218 USPQ 289** final product per se which must be determined in a “product by, all of” claim, and not the patentability of the process, and that an old or obvious product, whether claimed in “product by process” claims or not. Note that Applicant has the burden of proof in such cases, as the above caselaw makes clear.

Regarding claim 62, Bloom discloses in Fig. 4, Fig. 5, column 1, lines 7 ~ 21 and column 8, lines 21 ~ 40 a semiconductor package comprising:

- a hermetically sealed enclosure (80 and 70) surrounding said package;
- a semiconductor chip (any component on area 60) within said enclosure;
- a source of releasable hydrogen (30) within said enclosure; and
- a gas at an elevated pressure within said enclosure,
- said gas comprising a first gas component and a second gas component, wherein said second gas component results from the release of said releasable hydrogen, and wherein said first gas component is initially present within said enclosure prior to the release of said releasable hydrogen, and said first gas component is initially present at a pressure lower than said elevated pressure.

Regarding claim 88, Bloom discloses in Fig. 4, Fig. 5, column 1, lines 7 ~ 21 and column 8, lines 21 ~ 40 a semiconductor chip comprising:

- a hermetically sealed enclosure (70 and 80) surrounding said chip;

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- an integrated circuit (any components on 21) within said enclosure;
- a gas at a first pressure within said enclosure; and
- a source of releasable hydrogen (30) within said enclosure.

Regarding claims 94, 107, 119 and 130, Bloom discloses in Fig. 4 said chip further comprising at least one heat source (24) for heating the source of releasable hydrogen so as to effect the release of hydrogen.

Regarding claims 95 and 108, Bloom discloses in Fig. 4 said chip further comprising a plurality of heat sources (24) for heating the source of releasable hydrogen so as to effect the release of hydrogen.

Regarding claims 96 and 109, Bloom discloses in Fig. 4 and column 8, lines 21 ~ 40 said source of releasable hydrogen being at least one surface location of a layer of metal hydride.

Regarding claims 97 and 110, Bloom discloses in Fig. 4 and column 8, lines 21 ~ 40 said source of releasable hydrogen being a plurality of surface location of a layer of metal hydride.

Regarding claims 98, 111, 120 and 131, Bloom discloses in Fig. 4 and column 8, lines 21 ~ 40 further comprising a heater (any components on area 60) and associated heater circuitry (40).

Regarding claim 99, Bloom discloses in Fig. 4, Fig. 5, column 1, lines 7 ~ 21 and column 8, lines 21 ~ 40 a semiconductor chip comprising:

- a hermetically sealed enclosure (70 and 80) surrounding said chip;
- an integrated circuit (any components on 21) within said enclosure;
- a source of releasable hydrogen (30) within said enclosure; and
- a gas at an elevated pressure within said enclosure,

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- said gas comprising a first gas component and a second gas component, wherein said second gas component results from the release of said releasable hydrogen, and wherein said first gas component is initially present within said enclosure prior to the release of said releasable hydrogen, and said first gas component is initially present at a pressure lower than said elevated pressure.

Regarding claim 112, Bloom discloses in Fig. 4, Fig. 5, column 1, lines 7 ~ 21 and column 8, lines 21 ~ 40 a semiconductor chip comprising:

- a hermetically sealed enclosure (70 and 80) surrounding said chip;
- a gas at a first pressure within said enclosure; and
- a source of releasable hydrogen (30) within said enclosure.

Regarding claim 121, Bloom discloses in Fig. 4, Fig. 5, column 1, lines 7 ~ 21 and column 8, lines 21 ~ 40 a semiconductor chip comprising:

- a hermetically sealed enclosure (70 and 80) surrounding said chip;
- a source of releasable hydrogen (30) within said enclosure; and
- a gas at an elevated pressure within said enclosure,
- said gas comprising a first gas component and a second gas component, wherein said second gas component results from the release of said releasable hydrogen, and wherein said first gas component is initially present within said enclosure prior to the release of said releasable hydrogen, and said first gas component is initially present at a pressure lower than said elevated pressure.

***Claim Rejections - 35 USC § 103***

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

12. Claims 66, 67, 103, 104, 125 and 126 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bloom in view of Han et al.

Bloom discloses the claimed invention except for the gas comprising helium and from about 5% to about 10% hydrogen. However, Han et al. discloses in column 3, lines 59 ~ 67 a gas comprising helium and from about 5% to about 10% hydrogen. Thus, it would have been obvious to one of ordinary skill in the art at the time when the invention was made to modify Bloom by using the gas as taught by Han et al. The ordinary artisan would have been motivated to modify Bloom in the manner described above for at least the purpose of providing safety (column 3, lines 66 and 67).

13. Claim 72 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bloom in view of Polak et al.

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Bloom discloses the claimed invention except for said gas having a pressure of from about 5 MPa to about 50 Mpa. However, Polak et al. discloses in Fig. 1B and column 4, lines 52 ~ 54 a gas (35) having a pressure of from about 5 MPa to about 50 Mpa. Thus, it would have been obvious to one of ordinary skill in the art at the time when the invention was made to modify Bloom by using the range of pressure of the gas as taught by Polak et al. The ordinary artisan would have been motivated to modify Bloom in the manner described above for at least the purpose of preventing the power steering fluid from diffusing through bond pad platform (column 4, lines 55 and 56).

### *Conclusion*

14. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Ray et al. and Matsumoto disclose a semiconductor device.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chris C. Chu whose telephone number is (703) 305-6194. The examiner can normally be reached on M-F (10:30 - 7:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie C. Lee can be reached on (703) 308-1690. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7382 for regular communications and (703) 308-7722 for After Final communications.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Chris C. Chu  
Examiner  
Art Unit 2815

c.c.  
December 10, 2002

A handwritten signature in black ink, appearing to read "Eddie Lee", is written over a rectangular stamp.

EDDIE LEE  
SUSTAINMENT EXAMINER  
TECHNOLOGY CENTER 2800